

ABSTRACT OF THE DISCLOSURE

The present invention discloses a valve integrally associated with a microfluidic transport assembly that is useful for regulating the flow of a liquid sample through an analytical instrument such as, for example, a biosensor. The valve integrally associated with a microfluidic liquid transport assembly, includes: a first rigid layer having substantially planar and opposing first and second surfaces; a second rigid layer having substantially planar and opposing third and fourth surfaces, the third surface of the second rigid layer being substantially coplanar and integrally bonded to the second surface of the first rigid layer; a first passageway defined by a groove, the groove being along the second surface of the first rigid layer and bounded by the third surface of the second rigid layer, the first passageway being adapted to flow a liquid sample therethrough, a valve seat having a substantially planar plateau surface, the valve seat being within the passageway and integrally connected to the first rigid layer such that the plateau surface is substantially planar to and interposed between the first and second surfaces of the first rigid layer; and a flexible membrane opposite the valve seat and integrally associated with a first membrane through hole of the second rigid layer, the flexible membrane having a passageway surface that is either (i) substantially coplanar to the second surface of the first rigid layer when the valve is in an open position, or (ii) bulged with a central portion thereof being substantially coplanar to the plateau surface of the valve seat when the valve is in a closed position. The present invention is also directed to methods of manufacturing of the same.

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